

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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|--|--|--|------------------|
| Applicant's or agent's file reference IP/P7300/WOD | FOR FURTHER ACTION | | See item 4 below |
| International application No. PCT/GB2004/003192 | International filing date (<i>day/month/year</i>) 23 July 2004 (23.07.2004) | Priority date (<i>day/month/year</i>) 28 July 2003 (28.07.2003) | |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | | |
| Applicant QINETIQ LIMITED | | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 10 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

| | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input checked="" type="checkbox"/> | Box No. II | Priority |
| <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

| | | |
|---|--|---|
| | | Date of issuance of this report 30 January 2006 (30.01.2006) |
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | | Authorized officer |
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

REC'D 11 NOV 2004

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)Applicant's or agent's file reference
see form PCT/ISA/220Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)International application No.
PCT/GB2004/003192International filing date (day/month/year)
23.07.2004Priority date (day/month/year)
28.07.2003International Patent Classification (IPC) or both national classification and IPC
G02B6/42, G02B6/12FOR FURTHER ACTION
See paragraph 2 belowApplicant
QINETIQ LIMITED

1. This opinion contains indications relating to the following items:

Box No. I Basis of the opinion
 Box No. II Priority
 Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 Box No. IV Lack of unity of invention
 Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 Box No. VI Certain documents cited
 Box No. VII Certain defects in the international application
 Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1b/s(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2004/003192

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2004/003192

Box No. II Priority

1. The following document has not been furnished:

- copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
- translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2004/003192

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- the entire international application;
- claims Nos. 44-46

because:

- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 44-46 are so unclear that no meaningful opinion could be formed (specify):
see separate sheet
- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- no international search report has been established for the whole application or for said claims Nos.
- the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

- has not been furnished
- does not comply with the standard

the computer readable form

- has not been furnished
- does not comply with the standard

- the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

- See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY.**

International application No.
PCT/GB2004/003192

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | |
|-------------------------------|-------------|-------------------------|
| Novelty (N) | Yes: Claims | 1-22,25,26,29-36,38,40 |
| | No: Claims | 23,24,27,28,37,39,41-43 |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 1-43 |
| Industrial applicability (IA) | Yes: Claims | 1-43 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Re Item III.

Claims 44-46 have been formulated merely as general references to the application and one or more figures and, as such, fail to meet the clarity requirements of Article 6 PCT to such an extent that it is not possible to establish an opinion thereon regarding novelty and inventive step.

Re Item V.

1 The following documents are referred to in this communication:

D1 : WO 99/42879 A (INTEGRATED OPTICAL COMPONENTS ; WEEKS ALAN (GB); MURPHY MICHAEL MATTHE) 26 August 1999 (1999-08-26)

D2 : JENKINS R M ET AL: "Hollow waveguide integrated optic subsystem for a 10.6 [mu]m range-Doppler imaging lidar" PROCEEDINGS OF THE SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING SPIE-INT. SOC. OPT. ENG USA, vol. 4034, 24 April 2000 (2000-04-24), pages 108-113, XP002299729 ISSN: 0277-786X

D3 : US 5 525 190 A (HENKES JOHN L ET AL) 11 June 1996 (1996-06-11)

D4 : KRIPPNER PETER ET AL: "Microspectrometer system for the near infrared wavelength range based on the LIGA technology" PROC SPIE INT SOC OPT ENG; PROCEEDINGS OF SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING 2000 SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS, BELLINGHAM, WA, USA, vol. 3912, 26 January 2000 (2000-01-26), - 27 January 2000 (2000-01-27) pages 141-149, XP002299861

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.

2.1.1 Document D1, which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses (the references in parenthesis applying to this document) a transmitter apparatus (abstract)

comprising a laser (22), modulation means (32) and output means (34).

2.1.2 The subject-matter of independent claim 1 differs from the disclosure of D1 in that the apparatus comprises hollow core optical waveguides formed in a substrate which, in use, guide radiation from the one or more lasers to the modulation means and from the modulation means to the output means.

2.1.3 The problem to be solved by the present invention may therefore be regarded as the difficulty of actively aligning the laser to the modulator and the modulator to the output means via the free-space optics and fibre stubs disclosed in D1, and the associated variability of coupling loss due to repeatability errors.

2.1.4 In view of D2 the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons: D2 discloses (see page 113, para. 2) the monolithic integration of lasers and transceiver components in a single substrate, in which the lasers and components are interconnected by hollow waveguides formed in the substrate, in order to solve the same problem of otherwise relatively uncontrolled mutual alignment.

2.1.5 Therefore the features disclosed in D1 and D2 would be combined by the skilled person, without exercise of any inventive skill, in order to solve the problem posed. The proposed solution in independent claim 1 thus cannot be considered inventive (Article 33(3) PCT).

2.2 It is additionally considered that the skilled person would also arrive at the subject-matter of claim 1 by combining the disclosures of D1 and D3, without the exercise of inventive skill.

3 INDEPENDENT CLAIM 22

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 22 is not inventive in the sense of Article 33(3) PCT. Document D3 discloses (the references in parenthesis applying to this document): A transmitter apparatus comprising a light source (col. 6, lines 66-67) and output means for coupling the radiation into an optical fibre (58; col. 2, lines 35-38),

comprising hollow core waveguides formed in a substrate which, in use, guide radiation from the optical source to the optical fibre (col. 11, lines 25-41; Figs. 7, 8, 18).

The subject-matter of claim 22 therefore differs from the disclosure of D3 in that the light source is a laser. However, the selection of a laser as the light source in an optical transmitter would be an obvious design possibility for the skilled person, according to circumstances, in order to meet the performance requirements of the device.

4 INDEPENDENT CLAIM 23

4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 23 is not new in the sense of Article 33(2) PCT. Document D4 discloses (the references in parenthesis applying to this document): A receiver apparatus comprising detectors (abstract) and an optical fibre attachment means arranged to receive an optical fibre (Fig. 2), in which apparatus the radiation is guided from the optical fibre to the detectors by a hollow core optical waveguide formed in a substrate (abstract; page 143; Fig. 2).

5 DEPENDENT CLAIMS 2-21, 24-43

Dependent claims 2-21, 24-43 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT), for the following reasons.

Claims 2-6, 9, 10, 14, 16-19 and 21

The additional features are disclosed in D1 and/or D2. The subject-matter of the above claims therefore does not involve an inventive step in the sense of Article 33(3) PCT.

Claims 24, 27 and 28

The additional features are disclosed in D4. The subject-matter of the above claims is therefore not new (Article 33(2) PCT).

Claims 33 and 34

The additional features are implicitly disclosed in D3. It would be obvious to the

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/003192

skilled person to combine transmitter and receiver on a common substrate (claim 34) in order to solve the problem of minimising total apparatus footprint area. The subject-matter of said claims therefore does not involve an inventive step in the sense of Article 33(3) PCT.

Claims 7, 8, 11-13, 15, 20, 25, 26 and 29-32

The additional features represent variations in design that are routine in the field of integrated and fibre optic transmitters which would be obvious for the skilled person to consider incorporating according to circumstances in order to solve the problems posed.